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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,542	02/28/2007	Spiro Alexandratos	442155	4617

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EXAMINER	
BOYLE, ROBERT C	

ART UNIT	PAPER NUMBER
4131	

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11/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,542	ALEXANDRATOS ET AL.	
	Examiner	Art Unit	
	ROBERT C. BOYLE	4131	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/28/07, 2/17/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-16, 27-29, 31, 32, 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones, U.S. Patent 4,235,972 in view of Yoshimura et al., Complexation of Boric Acid with the N-Methyl-D-glucamine Group in Solution and in Crosslinked Polymer, J. Chem. Soc., Faraday Trans., 1998, 94(5), 683-689.

3. Claim 1 discloses a material comprising a crosslinked polymeric bead with bound protonated N-methyl-D-glucamine and a volume capacity of about 1.5 mmol/ml or less and has the capability to chelate As(V).

4. Jones teaches crosslinked polymer beads with pendant quaternary ammonium groups (column 5, lines 52-56; column 8, lines 60-62; column 4, lines 19-22; column 9, lines 51-53, claim 21) and a volume capacity of 0.91 (column 10, lines 14-16).

5. Claim 1 states properties of the material disclosed in claim 1: the capability to form a chelate with arsenic. Jones does not elaborate on the properties recited in claim 1. However, since the same material that is disclosed in claim 1 is taught in Jones, one of ordinary skill in the art would expect that the material of Jones would have the same properties as the material disclosed in claim 1.

6. Jones does not teach N-methyl-D-glucamine. Yoshimura teaches using methylglucamine on a polymer to form a chelate complex (page 683). One of ordinary skill in the art at the time the invention was made would have been motivated to modify the polymer beads in Jones with the methylglucamine taught in Yoshimura because Yoshimura teaches the formation of chelating complexes on polymers for adsorbing main group elements (Yoshimura, page 683). Therefore, the invention as a whole would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made.

7. Claim 2 discloses the volume capacity is 1.3 mmol/ml or less. Jones teaches this limitation (column 10, lines 14-16).

8. Claim 3 discloses the polymer is poly(vinylbenylchloride). Jones teaches polymers of vinylbenzyl choride (colum 4, line 3).

9. Claim 4 discloses the polymer is chloromethylated polystyrene. Jones teaches chloromethylating polymers of styrene (column 3, lines 16-18, 39-40).

10. Claims 5 and 6 disclose the monomer is a bi-, tri, or tetra- functional monomer, specifically divinylbenzene. Jones teaches using divinylbenzene as a monomer (column 3, line 23).

11. Claims 7 discloses the protonated methylglucamine is in chloride form. Jones teaches the protonated aminated polymer in chloride form by reacting the aminated polymer with hydrogen chloride (column 9, lines 51-53).

12. Claim 8 discloses the protonated methylglucamine is in sulfate form. One of ordinary skill in the art at the time of the invention would have known that the chloride anion taught in

Jones could be replaced with another anion, such as sulfate or bromide because anions are commonly interchangeable.

13. Claims 9 and 10 disclose the polymer has a dry weight basis of 2.4 mmol/gm or 2.5 mmol/gm or more. Jones teaches a dry weight capacity of 3.39 (column 11, lines 65-66).

14. Claims 11 and 13 disclose the polymer has a crosslinked ratio from about 2%-5% or 2%-7%. Jones teaches polymers crosslinked from 2 to 4 wt% (column 5, lines 2-6).

15. Claims 12 and 14 disclose the polymer is prepared using divinylbenzene or ethylene glycol dimethacrylate as a crosslinking agent. Jones teaches this limitation (column 3, lines 18, 26).

16. Claim 15 discloses a material comprising a crosslinked polymeric bead with bound protonated N-methyl-D-glucamine and a dry weight basis of 2.4 mmol/gm or more and has the capability to chelate As(V).

17. Jones teaches crosslinked polymer beads with pendant quaternary ammonium groups (column 5, lines 52-56; column 8, lines 60-62; column 4, lines 19-22; column 9, lines 51-53, claim 21) and a dry weight capacity of 3.39 (column 11, lines 65-66). Jones does not teach N-methyl-D-glucamine. Yoshimura teaches using methylglucamine on a polymer to form a chelate complex (page 683).

18. Claim 16 discloses a method for treating comprising contacting an arsenic (V) containing fluid with crosslinked polymeric beads, forming a chelate with the arsenic, and separating the chelated arsenic from the fluid. The polymeric beads have methylglucamine, a dry weight basis of 2.4 mmol/gm or more, and a volume capacity of about 1.5 mmol/ml or less.

19. Jones teaches crosslinked polymer beads with pendant quaternary ammonium groups (column 5, lines 52-56; column 8, lines 60-62; column 4, lines 19-22; column 9, lines 51-53, claim 21), a dry weight capacity of 3.39 (column 11, lines 65-66) and a volume capacity of 0.91 (column 10, lines 14-16). Jones does not teach N-methyl-D-glucamine. Jones teaches using resins for demineralizing and purification processes for water (column 2, lines 23-31).

20. Yoshimura teaches using methylglucamine on a polymer to form a chelate complex (page 683). Yoshimura also teaches contacting a crosslinked methylgulcamine resin to impurity containing water, where the resin chelates the impurity and the resin and chelated impurity is then removed from the water (page 684).

21. Claim 27 discloses a process for preparing the chelate polymer bead comprising obtaining the polymer bead with functional groups, reacting the groups with methylglucamine and producing a protonated methylglucamine; and the polymeric beads have a dry weight basis of 2.4 mmol/gm or more, and a volume capacity of about 1.5 mmol/ml or less.

22. Jones teaches forming crosslinked polymer beads followed by amination of the beads followed by protonation of the amines (column 5, lines 52-56; column 8, lines 60-62; column 4, lines 19-22; column 9, lines 51-53, claim 21). Jones also teaches a dry weight capacity of 3.39 (column 11, lines 65-66) and a volume capacity of 0.91 (column 10, lines 14-16). Jones does not teach using N-methyl-D-glucamine. Yoshimura teaches using methylglucamine on a polymer to form a chelate complex (page 683).

23. Claim 28 discloses the volume capacity is 1.3 mmol/ml or less. Jones teaches this limitation (column 10, lines 14-16).

24. Claim 29 discloses the polymer is poly(vinylbenylchloride). Jones teaches polymers of vinylbenzyl choride (colum 4, line 3).

25. Claim 31 discloses the polymer is chloromethylated polystyrene. Jones teaches chloromethylating polymers of styrene (column 3, lines 16-18, 39-40).

26. Claim 32 discloses the functional groups are haloalkyl groups. Jones teaches chloromethyl groups (column 3, lines 39-40).

27. Claims 34 discloses the protonated methylglucamine is in chloride form. Jones teaches the protonated aminated polymer in chloride form by reacting the aminated polymer with hydrogen chloride (column 9, lines 51-53).

28. Claim 35 discloses the protonated methylglucamine is in sulfate form. One of ordinary skill in the art at the time of the invention would have known that the chloride anion taught in Jones could be replaced with another anion, such as sulfate or bromide because anions are commonly interchangeable.

29. Claim 36 discloses a bead produced by the process of claim 27. Jones discloses the bead form (column 5, lines 52-56).

30. Claims 16-19, 21-26, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones and Yoshimura in view of Smith et al., U.S. Patent 5,908,557.

31. Claim 16 discloses a method for treating comprising contacting an arsenic (V) containing fluid with crosslinked polymeric beads, forming a chelate with the arsenic, and separating the chelated arsenic from the fluid. In the alternative, assuming Jones and Yoshimura do not teach chelating As(V), Smith teaches these limitations (column 3, lines 14-31).

32. One of ordinary skill in the art at the time the invention was made would have been motivated to modify the material in Jones with the method taught in Smith because Smith teaches an easily regenerated ion exchange resin (column 2, lines 52-67). Therefore, the invention as a whole would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made.

33. Claim 17 discloses the volume capacity is 1.3 mmol/ml or less. Jones teaches this limitation (column 10, lines 14-16).

34. Claim 18 discloses the polymer has a dry weight basis of 2.5 mmol/gm or more. Jones teaches a dry weight capacity of 3.39 (column 11, lines 65-66).

35. Claim 19 discloses the polymer is poly(vinylbenylchloride). Jones teaches polymers of vinylbenzyl choride (column 4, line 3).

36. Claim 21 discloses the polymer is chloromethylated polystyrene. Jones teaches chloromethylating polymers of styrene (column 3, lines 16-18, 39-40).

37. Claims 22 and 23 disclose the monomer is a bi-, tri, or tetra- functional monomer, specifically divinylbenzene. Jones teaches using divinylbenzene as a monomer (column 3, line 23).

38. Claims 24 discloses the protonated methylglucamine is in chloride form. Jones teaches the protonated aminated polymer in chloride form by reacting the aminated polymer with hydrogen chloride (column 9, lines 51-53).

39. Claim 25 discloses the protonated methylglucamine is in sulfate form. One of ordinary skill in the art at the time of the invention would have known that the chloride anion taught in

Jones could be replaced with another anion, such as sulfate or bromide because anions are commonly interchangeable.

40. Claim 26 discloses the fluid is groundwater. Smith teaches this limitation (column 5, lines 1-2).

41. Claim 37 discloses a system for treating fluid comprising a bed of polymeric beads. Smith teaches this limitation (column 6, lines 38-44).

42. Claims 20, 30, 33, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones, Yoshimura, and Smith in view of Virnig, U.S. Patent 5,198,021.

43. Claims 20, 30, 33 and 38 disclose the polymer is poly(glycidyl methacrylate). Virnig teaches this limitation (column 6, lines 14-22). One of ordinary skill in the art at the time the invention was made would have been motivated to modify the material in Jones with the polymer taught in Virnig because Virnig teaches an improved process for removal of arsenic containing compounds which includes a method of recovering the impurities (Virnig, abstract; column 1, lines 23-26; column 4, lines 15-30). Therefore, the invention as a whole would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT C. BOYLE whose telephone number is (571)270-7347. The examiner can normally be reached on Monday-Friday 9:00am - 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571)272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner
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